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Effect of Dry Bed Training on behavioural problems in enuretic children

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Children with nocturnal enuresis ($n = 91$) selected by school doctors in the Netherlands from 1991 to 1994 were included in a study to assess the course of behavioural problems especially when the children became dry after the Dry Bed Training (DBT) programme. The Child Behaviour Checklist (CBCL) questionnaire was completed by 88 parents (96%) prior to DBT (T1) and by 83 parents (91%) 6 mo after DBT (T2). The mean CBCL total problem score at T1: 24.0 (range 2–91, SD 16) was significantly higher than that of a Dutch norm group: 20.45, ($p = 0.025$). Compared to T1, the mean CBCL total problem score at T2 was 16.8 (range 0–73; SD 14.7; $p < 0.0001$). Of the children with CBCL total problem scores at T1 in the borderline or clinical range, 92% became dry and 58% improved to the normal range. At T2, the children seemed to have less internal distress, fewer problems with other people, and were less anxious and/or depressed.

Conclusion: Children with behavioural/emotional problems who wet their beds need not first be treated for their behavioural/emotional problems. Bedwetting can be treated successfully with DBT when other treatments such as normal alarm treatment have failed, and alarm treatment/DBT can have a positive influence on behavioural/emotional problems.

Key words: *Behavioural and/or emotional problems, CBCL, enuresis nocturna*

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Enuresis nocturna is a common disorder affecting 15–20% of 5-y-old children and 1–2% of adolescents (1, 2). The acquisition of night-time bladder control is an important stage in the development of children.

Enuresis is a socially embarrassing symptom, with concomitant emotional and behavioural difficulties (3). However, from the studies showing an association between bedwetting and behavioural/emotional problems it is not clear whether these problems are the cause or the consequence of the enuresis (3, 4).

Many claims have been made supporting the view that enuresis is a result of social adversity or psychological trauma. These claims have sometimes taken on mythical proportions, such that families have been negatively affected by the attitude that they are themselves to blame, or are at least indirectly responsible for the problem (5). Enuretic children with behavioural problems are sometimes first referred to psychosocial workers or a psychiatrist in order to treat their behavioural problems in the belief that these are the cause of the bedwetting.

Although a great deal of literature addresses the possible psychological correlates of enuresis (6–8), only a few studies have evaluated changes in behavioural problems when the child is successfully cured of bedwetting (8–12). From these studies it is not completely clear if the improvements are related to the alleviation of the enuresis.

For children with enuresis nocturna, various treatment approaches are available. One of these is the Dry Bed Training (DBT) programme, which involves behaviour modification therapy and incorporates the use of an enuresis alarm along with a variety of other procedures, which are divided into three stages:

- Intensive training during one night: waking the child every hour, conditioning him/her to wake up to mild prompts.
- Practising going to the toilet and reinforcement of urinating on the toilet at night.
- Extensive follow-up training, which starts on the

second night and continues until the child has managed to stay dry for 14 consecutive nights.

A few examples of the many aspects covered are:*alarm therapy*, *positive practice* (to get the child into the habit of waking up and automatically going to the toilet) and *cleanliness training* (which teaches the child to take full responsibility for changing his/her own bed sheets, pyjamas, etc.). When the child has achieved the goal and is dry: instructions are given on how to cope should a bedwetting accident occur.

DBT is an intensive training programme and should be reserved for cases resistant to the normal alarm treatment or for special cases (13).

In 1996 we published the results of the intensive DBT programme for groups of parents with enuretic children (13). This paper describes the effect of DBT on behavioural/emotional problems in enuretic children.

Aim

The aim of this part of the study was to assess the course of behavioural problems, especially when the children were successfully cured of their bedwetting.

Population and method

Children with nocturnal enuresis ($n = 91$) were selected from various primary schools by school doctors from the Youth Healthcare sections of two Community Health Services in the Netherlands from April 1991 to May 1994 during the regular school health examinations. The selection criteria and details regarding recruitment have been described elsewhere (13). In short: prior to taking part in the programme, the child was examined by the school doctor in order to exclude any underlying pathological causes of enuresis or other disorders. After an interview with the parent(s), the school doctor decided whether the child could join the DBT programme. The criteria for inclusion were: monosymptomatic nocturnal enuresis; the child had to be at least 6 y old; previous treatments had failed; both parent and child were motivated.

The criteria for exclusion in the DBT were: any underlying pathological cause of the enuresis; relational problems between the child's parents or between parent and child; parents unable to read, speak or write the Dutch language; evidence of imminent life events in the family (birth of a sibling, divorce, moving house).

The entry criteria for the DBT instruction programme were fulfilled by 74 boys and 17 girls aged from 6 to 15 y, with a mean age of 9.3 y. Before starting DBT, the children were wetting the bed on average 5.4 times a week; 12 (13%) of them had secondary nocturnal enuresis (again wet after being dry for more than 6 mo). Prior to DBT only 14% had tried one type of therapy, 68% had tried 2 or 3 types and 18% had tried 4 to 8 types of therapy. Waking or lifting the child at night and restricting fluid intake had the highest rates (87% and 68%), drug treatment and alarm treatment were both used in 24% before DBT, bladder training in 20% and other therapies in 32%.

The parents included in the DBT instruction programme were asked to complete two questionnaires:

- Questionnaire I, completed prior to the start of the DBT (T1), aimed at obtaining general data as well as background information relevant to the enuresis.
- Questionnaire II had to be completed 6 mo after completion of the first questionnaire (T2). The objective of this questionnaire was to record the results achieved with the DBT programme and to record the viability of DBT based on the experiences of the parents.

The results of these questionnaires have been published earlier (13).

To assess behavioural/emotional problems the Child Behaviour Checklist (CBCL) (14) was completed by the parents on two occasions, i.e. before (T1) and 6 mo after the DBT (T2).

The Dutch version of the CBCL (15) was used to obtain standardized reports from parents about problem behaviour in their children. The checklist includes 20 competence items and 118 problem items. Only the findings of the problem section will be reported here. Parents are requested to circle a zero if the problem is not true of their child, 1 if the item is somewhat or sometimes true, and a 2 if it is very true or often true. A total problem score is computed by summing all zeros, ones and twos. The possible range of scores is 0–236. The CBCL total problem score is broken down into a normal range, a borderline range for scores between the 85th and the 90th percentile of the distribution of scores in the general population and a clinical range for scores above the 90th percentile. Scores in the clinical range are comparable with those of children receiving mental health care for behavioural/emotional problems. Eight syndrome scale scores (Withdrawn, Somatic complaints, Anxious/Depressed, Social problems, Thought problems, Attention problems, Delinquent behaviour and Aggressive behaviour) with different cut-off values are computed by summing the scores of the items belonging to the scales. Two broadband groups of syndromes, designated as "externalizing" and "internalizing" problems were also used in the analyses. Externalizing problems reflect conflicts with other people and their expectations of the child, whereas internalizing problems reflect internal distress. The internalizing group includes the anxious/depressed, somatic complaints, and withdrawn syndromes. The externalizing group includes the aggressive and delinquent behaviour syndromes.

The CBCL is suitable for use in clinical practice as well as in research. Parents can complete the questionnaire in 15–20 min, and for the researcher or

Table 1. Children scoring in the clinical, borderline and normal range of the total problem scale of the Child Behaviour Checklist (CBCL) before dry bed training (DBT) (T1) and 6 mo after DBT (T2).

	No. (%) of children in the Success group ($n = 66$)		No. (%) of children in the No-success group ($n = 12$)		No. (%) of children in the total group ($n = 78$)	
CBCL range	T1	T2	T1	T2	T1	T2
Clinical	15 (23)	7 (11)	1 (8)	1 (8)	16 (21)	8 (10)
Borderline	7 (11)	3 (5)	1 (8)	1 (8)	8 (10)	4 (5)
Normal	44 (67)	56 (85)	10 (83)	10 (83)	54 (69)	66 (85)

diagnostician it is easy to use. The good reliability and the discriminative validity established by Achenbach and Edelbrock were confirmed in other studies using the Dutch translation of the CBCL (16–18). Comparisons between American and Dutch large population samples showed a non-significant difference, which means the CBCL is applicable in the Netherlands, too.

However, the CBCL is an instrument which gives a standardized description of the problem behaviour of the child as reported by the parents. It is not meant to be an instrument to assess clinical diagnosis or treatment.

This study has a retrospective, case-control design in which we compare the CBCL scores at T1 and T2 with those children who did and those who did not profit from the DBT. The Dutch norms for the CBCL were used as a reference (15).

Results

Results of the bedwetting

Six months after treatment, the enuresis decreased from an average of 5.4 episodes a week to an average of 1 episode a week. The bedwetting of children who continued to wet the bed after 6 mo decreased from 5.8 times a week to 3.3. times a week after treatment. Bedwetting frequency before training had no influence on achieving dryness. No statistical differences were found between the successful and unsuccessful groups regarding the variables age, sex, bed-wetting frequency, secondary enuresis, family history and therapies followed.

Results at T1

The CBCL questionnaire was completed by 88 parents (96%) prior to the DBT programme (T1) and by 83 parents (91%) 6 mo after DBT (T2). We used the results of those respondents who completed the CBCL questionnaires at both T1 and T2 ($n = 78$).

Table 2. Mean Child Behaviour Checklist (CBCL) total problem scores at T1 and T2.

	n	T1	T2
Success group	66	25.7	17.5***
No-success group	12	15.1	13.3*
Total group	78	24.0	16.8

*** $p < 0.0001$.
* $p = 0.32$ NS.

The distribution of children in the different CBCL ranges at T1 and T2 is presented in Table 1. At T1, 54 children (69%) had normal CBCL scores on the total problem scale; 16 children (21%) were in the clinical range and 8 children (10%) in the borderline range. Boys ($n = 62$) had a CBCL total problem score of 24.03 and the girls ($n = 16$) 24.06 . Evidently, the bedwetting boys did not differ significantly in the level of behavioural/emotional problems from the girls ($p = 0.89$). The mean CBCL score at T1 was 24.0 (range 2–91; SD 16) (Table 2), which was significantly different from the mean CBCL score in the Dutch norm group, where the mean was 20.45 ($t\ (80) = 1.98$, $p = 0.025$, one-sided).

Results at T2

Six months after the training the number of children in the clinical range on the total problem scale dropped from 16 to 8 and in the borderline range from 8 to 4, which is a statistically significant difference ($p = 0.0047$ Wilcoxon test) (Table 1).

Fifteen out of 16 children with CBCL total problem scores in the clinical range reached the continence criterion (14 consecutive dry nights), but one child did not. Nine of these 16 children were in the normal range at T2, 1 child was in the borderline range and 6 remained in the clinical range. The one child who did not reach the continence criterion stayed in the clinical range. Of the 8 children in the borderline range, 7 became dry, but one child did not. Five of these children had normal scores at T2, 2 in the borderline range and 1 child in the clinical range. The one child who did not reach the continence criterion remained in the borderline range. In other words: of the children with high CBCL total problem scores at T1 (in the borderline or clinical range), 92% became dry (>success group =) and 58% improved to the normal range. Of the 54 children with normal CBCL total problem scores at T1, 81% reached the continence criterion and 10 children (19%) did not. The CBCL total problem score of one dry child increased to the clinical range and one to the borderline range.

For the group as a whole, the CBCL total problem score declined from 24.0 at T1 to 16.8 at T2

Table 3. Mean syndrome scores for the Success- and the No-success groups before (T1) and after the dry bed training (T2).

	Success group ($n = 66$)		No-success group ($n = 12$)		Total group ($n = 78$)	
Syndrome scales	T1	T2	T1	T2	T1	T2
Internalizing	6.5	4.6***	4.2	4.1	6.2	4.5***
Externalizing	8.3	6.4**	4.3	3.7	7.7	5.9***
Withdrawn	2.5	2.2	1.8	1.6	2.4	2.1
Somatic complaints	0.9	0.4*	0.5	0.3	0.8	0.4**
Anxious/Depressed	3.2	2.1***	1.8	2.2	3.0	2.1***
Social problems	1.7	1.3	0.3	0.3	1.4	1.1
Thought problems	0.6	0.4	0.7	0.8	0.6	0.4
Attention problems	3.7	2.8*	0.9	0.6	3.2	2.5**
Delinquent behaviour	1.2	0.8*	1.3	1.3	1.2	0.9
Aggressive behaviour	7.1	5.5*	4.4	2.3	6.6	5.0**

*** $p < 0.0001$ (paired sampled t-tests); ** $p < 0.001$; * $p < 0.01$.

($t = (80) = 6.56$; $p < 0.000$) (Table 2). There were no evident differences in the decline in scores between boys and girls. The mean CBCL total problem score at T1 of the Success group was 25.7 (range 2–91; SD 16) and of the No-success group 15.1 (range 2–43; SD 12.9). However, this difference was not significant. The mean CBCL total problem score of the Success group declined significantly from T1 to T2 ($t\ (65) = 6.44$; $p < 0.000$, paired sampled t-test). This difference was not seen in the results of the No-success group; however, the number of subjects in the No-success group was very small.

Prior to the DBT, children who became dry had significantly higher scores on social problems (1.7; $p = 0.005$) and attention problems (3.7; $p = 0.04$) than the children who remained wet (respectively: 0.25, 0.92).

When we take a look at the syndrome scales across time, we found the same results as those with the total problem scores: it was only in the Success group that we obtained significant changes from T1 to T2. The following syndromes show a very significant difference between T1 and T2: Internalizing, Anxious/Depressed, Externalizing (Table 3).

Discussion

In our study, the mean CBCL total problem score at T1 (24.0) differed statistically significantly from the Dutch norm group (20.45). In other words, on average, this group of bedwetting children had more behavioural/emotional problems than the Dutch norm group. However, this was a selected group of children with persistent bedwetting. In a population-based study, the CBCL total problem score of 66 children with enuresis nocturna was similar to that of the norm group (19).

What is remarkable is that the mean CBCL total problem score dropped significantly from T1 to T2, especially among the children who became dry. At T2, after the training, children seem to have less internal distress, fewer problems with other people, and were less anxious and/or depressed than at T1, before the training. Of the children who had a CBCL total problem score in the borderline or clinical range, 92% became dry and 58% improved their score to the normal range at T2. This corresponds with the hypothesis that behavioural/emotional problems are often a *consequence* of the bedwetting rather than the cause (20, 21). Behavioural/emotional problems are sometimes described as a factor inducing secondary nocturnal enuresis, although other authors find no differences in behavioural/emotional problems between primary and secondary enuretics (1, 19). Even if problems precede the secondary enuretic events, this does not mean that behavioural/emotional problems are a cause of the bedwetting. Perhaps the problems activate or trigger a (temporary) imbalance in a child whose voidingsystem is just over the edge of becoming dry but is prone to bedwetting.

From our study we can also conclude that children with behavioural/emotional problems who wet their beds do not need to be treated first for their behavioural/emotional problems.

Children who have a score in the clinical or borderline range become dry just as often as children with a score in the normal range. So it seems that bedwetting can be treated successfully with DBT when other treatments such as normal alarm treatment have failed, and alarm treatment/DBT can have a positive influence on the behavioural/emotional problems. This is in concordance with the literature where Moffatt (11) also described how the self-perception of children appears to improve with successful treatment; the improvements in self-perception will not result in a cure for a genuine psychiatric disturbance; there is no evidence that the behaviour in children who fail treatment will deteriorate. Hägglöf et al. (12) showed that children with nocturnal enuresis have low self-esteem and that their self-esteem may be normalized with the appropriate treatment (alarm treatment or desmopressin).

Although the results of our study are very encouraging, it should be noted that this study did not have a case-control experimental design. Therefore it might be suggested that the decline in behavioural/emotional

problems is attributable to regression towards the mean or to natural fluctuations. However, deviant scores are very unlikely to drop into the normal range, as was the case in this group. Of the children in the Dutch general population who were scored in the deviant range for CBCL total problems, even after 2 y, only 44% were scored normal and 56% after 4 y (17, 18), whereas in this sample, 60% of the deviant scores dropped into the normal range after 6 mo. Furthermore, two observations argue for the conclusion that the decrease in problem behaviour was consequential to the DBT programme. First, the effect of the training was not any better in the children with CBCL scores below the borderline or clinical cut-point, indicating that high initial levels of problem behaviour are no obstacle to treatment effect. If the behavioural/emotional problems had been independent of the enuresis problem, these problems would have hindered the parental management required for successful DBT. Second, 83% of the children in the Success group showed a decline in problem behaviour.

Furthermore, our study shows that the mean CBCL score of the children in the No-success group did not change between T1 and T2. They seemed to have a lower score at T1 than the Success group but this difference was not significant. At T2 the scores between the Success and the No-success groups were comparable. The behaviour of children in the No-success group remained unchanged after training. It could be that parents do not want to make a fuss about the bedwetting and do not see any advantage in the behavioural therapeutic approach. Congruently, they may put less effort into the training themselves, which could lead to the child becoming less motivated to become dry.

A shortcoming of this study is that only parent reports were used, as information by teachers and scholastic results were not available.

Conclusion

The behavioural/emotional problems of children who wet their beds need not be treated first. Children who have relatively many behavioural/emotional problems, according to parental reports, become dry just as often as children with problem scores in the normal range. After successful treatment of enuresis, children seem to have less internal distress, fewer problems with other people and are less anxious/depressed. Bedwetting can be treated successfully with DBT when other treatments such as normal alarm treatment have failed, and alarm treatment/DBT can have a positive influence on behavioural/emotional problems.

References

1. Rushton HG. Wetting and functional voiding disorders. Urol Clin North Am 1995; 22: 75–93
2. Schulpen TWJ, Hirasing RA, Jong TPVM de, Heyden AJ van der, Dijkstra RH, Sukhai RN, et al. Going Dutch in enuresis nocturna. Acta Paediatr Scan 1996; 85: 199–203
3. Rutter M, Yule W, Graham P. Enuresis and behavioural deviance: some epidemiological considerations. In: Kolvin I, MacKeith RC, Meadow SR, editors. Bladder control and enuresis. Philadelphia: JB Lippincott; 1973. p. 137–47
4. Hallgren B. Enuresis: a clinical and genetic study. Acta Psychiatr Neurol Scand 1957; 32 Suppl 114
5. Gillberg C. Enuresis: psychological and psychiatric aspects. Scand Urol Nephrol 1995; Suppl 173: 113–7
6. Johnson SB. Enuresis. In: Daitzman R, editor. Clinical behaviour therapy and behaviour modification. New York: Garland Publishing Inc.; 1980
7. Couchells S, Johnson SB, Carter R, Walker, D. Behavioural and environmental characteristics of treated and untreated enuretic children and matched nonenuretic controls, J Pediatr 1981; 99: 812–6
8. Wagner W, Johnson SB, Walker D, Carter R, Wittner J. A controlled comparison of two treatments for nocturnal enuresis. J Paediatr 1982; 101: 302–7
9. Baker B. Symptom treatment and symptom substitution in enuresis. J Abnorm Psychol 1969; 74: 42–9
10. Sacks S, de Leon G, Blackman S. Psychological changes associated with conditioning functional enuresis. J Clin Psychol 1974; 30: 271–6
11. Moffatt MEK. Nocturnal enuresis: psychologic implications of treatment and nontreatment. J Pediatr 1989; 114: 697–704
12. Hägglöf B, Andrén O, Bergström E, Marklund L, Wendelius M. Self-esteem in children with nocturnal enuresis and urinary incontinence: improvement of self-esteem after treatment. Eur Urol 1998; 33 Suppl 3: 16–9
13. Hirasing RA, Bolk-Bennink LF, Reus H. Dry bed training by parents: results of a group instruction program. J Urol 1996; 56: 2044–6
14. Achenbach TM. Manual for the Child Behavior Checklist/4–18 and 1991 Profile. Burlington, VT: University of Vermont, Department of Psychiatry; 1991
15. Verhulst FC, van der Ende J, Koot HM. Handleiding voor de CBCL/4-18. Rotterdam: Afdeling Kinder-en jeugdpsychiatrie, Sophia Kinderziekenhuis; 1996
16. Achenbach T, Lewis M. A proposed model for clinical research and its application to encopresis and enuresis. J Am Acad Child Psych 1971; 10: 535–54
17. Verhulst FC, Althaus M. Persistence and change in behavioral/emotional problems reported by parents of children aged 4–14. Acta Psychiatr Scand 1988; 339: 1–28
18. Verhulst FC, Koot JM, Berden FMG. Four-year follow-up of an epidemiological sample. J Am Acad Child Adolesc Psychiatry 1990; 29: 440–8
19. Hirasing RA, Leerdam FJM, Bolk-Bennink LF, Bosch JD. Bedwetting and behavioural and/or emotional problems. Acta Pædiatr 1997; 86: 1131–4
20. Messer AP. Zeer moeilijk eten en moeilijk beïnvloedbaar bedplassen. Proefschrift Rijksuniversiteit Leiden 1979
21. Baller WR. Bedplassen: oorzaken en behandeling. Deventer: Van Loghum Slaterus; 1975

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